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*178 The Innovations

243 A. Agricultural Innovations: During the past few years,
493 certain innovations have come to Long Chan which have increased agricultural productivity and improved the level of living. Some of these innovations are listed below.

1. The small motor. One innovation is the small engine,
*402 gasoline motor, which is used mainly as a water-lifting device for
*177 irrigation purposes. In 1950 only five small motors were found in
178 Long Chan. Twenty-one per cent of the respondents in the 1953
[244] survey, however, report owning these motors; the majority of the respondents (60 per cent) claim to have used this labor-saving device which is sometimes jointly owned by more than one household and is frequently loaned out.**

2. Straw mushroom growing. Three years ago the com-
244 mercial growing of mushrooms in Long Chan was unknown. By 1955,
434 the practice of growing mushrooms had reached into many homes
*177 (44 per cent of the respondents report that they have engaged in
*178 this activity***). Even if no mushrooms have ever been grown in a given household, it is still likely that the individuals in it are aware of the practice and have observed it closely through the mushroom growing activities of their friends, relatives, and neighbors (reported in 43 per cent of the households). Only a few households (13 per cent) report that they have never grown mushrooms or have never been exposed to it in this way.

One advantage in the culture of straw mushrooms is that it permits quickly realized returns. The cycle, from sowing spores in moistened straw to harvesting the mushrooms, takes about two to three weeks. Another advantage is that there is relatively little heavy work or investment required besides the acquisition of straw and spores. A third advantage is a ready market, for the plant is sought by Chinese dealers in Bangkok who supply hotels and restaurants. Long Chan rice farmers who engage in mushroom growing as a sideline activity sell it either to local middlemen or directly to the Chinese in Bangkok.

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[113] * Sharp, L., H. M. Enoch, K. Janlekha, and H. B. Textor, Siamese Rice Village. A Preliminary Study of Bang Chan. Thailand, Cornell Research Center, June, 1953.

[125] ** The questions: "Do you own a small engine motor or not? (If NO"): Have you ever made use of one in your work?"

[125] *** The question: "Have you ever grown mushrooms, or not?"

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743 *177 *178 **Institutional Care of the Sick:** Equally important as agricultural innovations in raising the level of living of an area such as Bang Chan are the efforts to improve the health and welfare of the population. Since the thirties there has been a clinic in the neighboring market town of Minburi and some Bang Chan farmers used clinics and hospitals in Bangkok before that time. Only about a third (36 per cent) say they have never been to a clinic or a hospital; over a third (37 per cent) have themselves gone for treatment; about one fourth (23 per cent) report having brought a patient there; over one tenth (12 per cent) say they visited relatives there; and a few (3 per cent) say they went there for various other reasons.*

ANALYSIS OF DATA ON AGRICULTURAL INNOVATIONS

121 The central question to which the present analysis directs itself is: What are some of the factors which may be said to account for the fact that certain members of the community are willing to try out these innovations and to continue using them, while others are unwilling even to make the initial attempt? Is there some general pattern to be discerned among the several innovations? Is there any discernible clustering among them; that is, are some community members more "innovation-minded" than others, in the sense that if they try out or accept one innovation they are more likely to accept another? Or are these innovations accepted independently of each other? The following analysis of the survey responses attempts to shed some light on these and related problems.

Factors in Acceptance of Agricultural Innovations

241 * 402 *177 *178 Use of the small motor is basic to acceptance of other agricultural innovations. Although only a minority of the persons of Bang Chan report that they own a small motor, many more used this machine through joint ownership or borrowing. Indeed, knowing whether a person owns or uses such a motor is a useful indicator of his readiness to accept other agricultural innovations. If he owns or has used a motor, then he is about five times more likely than others to try fertilizer, about two and a half times more likely to try raising tilapia, and about one and a third times more likely to try straw mushrooms.

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[125] * The question: "Have you ever been to a clinic or hospital...? In what various places...? For what various purposes did you go ...?"

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TABLE 1. THOSE WHO OWN OR USE SMALL MOTOR ARE MORE LIKELY THAN OTHERS TO TRY OTHER AGRICULTURAL INNOVATIONS (FARMERS ONLY)

	Owns motor	Does not own motor but uses it	Neither owns nor has used motor
(Total cases)*	(70)	(150)	(104)
Have you ever used fertilizer?**			
Yes	18%	14%	3%
No	82	84	97
Have you ever raised tilapia?			
Yes	33%	29%	22%
No	67	71	78
Have you ever grown mushrooms?			
Yes	62%	49%	37%
No	38	51	64

[125]

* The bases on which per cents are computed appear in parentheses at the head of each column in this and subsequent tables. Actually the bases vary by a few cases, table to table, since there were always a few respondents who did not answer a given question or whose answers were unclassifiable.

** Asked of farmers only. The bases are:

Owns motor	63
Does not own motor but uses it	141
Neither owns nor has used motor	82
NA	3

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There is some evidence, then, that if a person is willing to try out one agricultural device, such as the motor, he is more likely to try out other agricultural innovations. However, this "clustering" cannot support the hypothesis that there is something like "innovation mindedness" in general, or that acceptance of any innovation in a series is predictive of acceptance of all other innovations in the same series.

Evidence may be cited to substantiate this contention. In the first place, if such a clustering indeed prevailed, one would expect users of any of these agricultural innovations to be more disposed than others to use, as well, certain non-agricultural innovations, such as hospital or clinic facilities, for example.

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228 And so much tendency may be discerned in the present data. (See
Table 2.)
241 TABLE 2. USERS OF HOSPITAL AND CLINIC FACILITIES SHOW NO SIGNIFI-
244 CANT DIFFERENCES IN RATES OF ACCEPTANCE OF AGRICULTURAL
743 INNOVATIONS
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Agricultural Innovations	Percentage who have ever gone to hospital or clinic for treatment	Total cases
Mushrooms		
Tried them out	34%	(143)
Never did	38	(188)
Tilapia		
Tried it out	44%	(104)
Never did	34	(223)
Motor		
Tried it out	37%	(213)
Never did	36	(104)
Fertilizer*		
Tried it out	37%	(32)
Never did	34	(232)

* Farmers only

228 In the second place: use of the motor is much less strongly
241 linked to use of mushrooms than the use of fertilizer or tilapia.
244 It may well be that there may be some common factor strongly under-
lying the decision to use the motor on the one hand, fertilizer and
tilapia on the other, while the decision to try mushroom-growing
• 402 is relatively more "autonomous". A possible explanation for the
*177 greater "autonomy" may be sought in the differential requirements
*178 for growing mushrooms compared with the requirements for adopting
the other innovations.

Both tilapia and sulphates demand extra heavy work, care, an essential initial investment, and willingness to wait for a delayed return. An additional requirement for a successful and continuous pay-off from both these innovations may be an aptitude to follow rather complicated instructions. In the case of mushroom growing, however, the initial investment is relatively small, the labor may be tedious but is not heavy, no protracted or complicated care is involved, and the results of the effort are relatively quickly realizable.

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It appears, then, that we may be dealing with two types of innovations, one type (fertilizer and tilapia) where attitude is linked to decision to use it and another (mushrooms) where attitude seems to be unrelated to such use.* And here again may be further substantiation of the greater autonomy of the acceptance of mushroom growing. For, in the case of innovations such as artificial fertilizer and tilapia, it is known that they require investment of funds and labor, risk, delayed return, and departure from well-known ways. It could be that in the face of these disadvantages acceptance will occur only if motivation is high. Acceptors would then be selected mainly from among those who have high motivation and accompanying positive affective feeling. Those who do not have these feelings would, following this reasoning, be less likely to overcome their objections to the disadvantages of the innovation in question.

There is also the second type of innovation like mushroom growing. This innovation is much less "costly" not only of funds but effort. Hence, high motivation and accompanying positive affect might be less influential than other factors--factors quite aside from the crop itself--on acceptance of this type of innovation. Consequently, growers of mushrooms may be recruited equally from persons with favorable attitudes and less favorable attitudes towards this crop.

These findings suggest the more general hypothesis (which might be corroborated by analysis of related contextual data collected in Bang Chan, and by examining equivalent situations in other underdeveloped areas) that: the more complex the innovation, the more effort involved in employing it, the more risk involved, and the less immediate the return, the greater the likelihood that acceptors will be recruited from a selected group of highly motivated people, rather than at random among all persons "eligible" to accept it. If the innovation requires the high motivation which is needed to overcome the disadvantages of investment, work, risk, and rarity, then this attitude toward it is important. If the innovation demands only short-term investment and relatively light labor, then this motivation is of little importance in the decision to try it.

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Sociological Factors in Agricultural Innovation

The decision to use the small motor, once made, tends to accelerate the decision to try out other agricultural innovations, especially fertilizer and tilapia and, to a lesser extent, even mushrooms.

* Both mushroom growing and tilapia raising are sideline activities to the Bang Chan rice farmer and are, therefore, comparable in this respect.

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228 mushrooms. The following section searches for sociological factors
241 linked to these decisions. For example, are the well-to-do farmers*
244 more apt than the less well-to-do to adopt agricultural innovations?
To what extent is literacy a factor in acceptance of innovations?
To what extent do differences in literacy, communications habits,
cultural contacts and urban orientation account for tendencies to
adopt or reject these changes?

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[125] The following analysis has been made, in most cases, for male farmers only. The distribution of initial acceptance among the three groups of male farmers, females, and male non-farmers is given in the following table.

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TABLE 6. USE OF AGRICULTURAL INNOVATIONS AMONG THREE GROUPS OF LAKE CHAD VILLAGERS

	Male Farmers (211)	Male Non-farmers (81)	Females (32)
Tried motor	71%	61%	48%
Didn't try	29	39	52
Tried mushroom growing	66%	35%	41%
Didn't try	34	65	59
Tried tilapia raising	33%	25%	31%
Didn't try	67	75	69
Tried fertilizer	15%	7%	oo
Didn't try	85	93	

oo Asked of farmers only.

It is apparent, as one would expect, that it is mainly the farmers who try these innovations. Relatively few women (with the exception of tilapia raising) and even fewer non-farmers say they have tried them. Since the absolute number of acceptors among women and non-farmers is too small to bear the separate treatment which would be essential to analyze the factors influencing the use or non-use of innovations, they have been excluded from the following presentation, which refers, thus, to male farmers only.

6: Goldsen and Ralis Z-4.5 (1955) 1957
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Decisions to use all these innovations--with the possible exception of the use of fertilizer--seem to be more widespread among the upper economic levels of the population. (See Table 9.) One wonders whether the initial link between use of the motor and readiness to try the innovations may actually disguise a more basic relationship based simply on ability to afford the investment and the risk.

TABLE 9. FARMERS* ON HIGHER SES LEVELS ARE MORE LIKELY THAN OTHERS TO HAVE USED THE MOTOR, TO HAVE GROWN MUSHROOMS AND TO HAVE RAISED TILAPIA

	Ownership of Buffaloes	
	2 or less (99)	3 or more (112)
Used motor		
Own	9%	37%
Use	33	45
Neither	41	18
Grow mushrooms		
Yes	30%	60%
No	70	40
Raised tilapia		
Yes	36%	42%
No	74	58
Used fertilizer		
Yes	12%	17%
No	78	83

* Male farmers only

The following table presents again the initial relationships between use of motor and readiness to try out other innovations. But this time the link is examined separately for persons on the different economic levels.

Table 9 was made by first dividing the population into two groups, those from high and those from low economic levels. The resulting two groups were then further subdivided on the basis of whether they owned (or used) a motor or whether they did not. In each of the four resultant groups the percentage that raised tilapia was then calculated. Thus among those of high economic level who own or use motors, 45 per cent raised tilapia, and we infer that 55 per cent did not raise tilapia. The same procedure was repeated to ascertain the percentage that has tried fertilizer and subsequently the percentage that has tried mushroom growing.

This table shows that in tilapia raising both factors operate independently and cumulatively, i.e. people who are better off economically and who also own or use the motor are almost two and a half times as likely to raise tilapia as their economically depressed counterparts who neither own nor have access to the motor. (45 versus 17 per cent respectively.)

The link between use of the motor and attempt to try fertilizer holds regardless of economic level.

The initial link between ownership or use of the motor and growing of mushrooms, on the other hand, is shown to be a conditional one. Those on a higher economic level are more likely than others to try mushroom growing, whether or not they own or use a motor. Those on the lower economic level, with access to a motor are more likely to take up tilapia culture.

TABLE 9. RELATIONSHIP OF USE OF MOTOR AND OTHER INNOVATIONS TO ECONOMIC LEVEL

	Economic level	
	High*	Lower**
Owns or used motor (Proportion who have raised tilapia)		
Yes	45% (89)	33% (37)
No	23 (31)	17 (40)
Owns or used motor (Proportion who have tried fertilizer)		
Yes	20% (89)	14% (37)
No	3 (31)	* (40)
Owns or used motor (Proportion who have tried mushroom growing)		
Yes	40% (89)	30% (37)
No	17 (31)	23 (40)

* Three buffaloes or more
** Two buffaloes or fewer

[231]

LITERACY

One important hypothesis to account for differential acceptance of innovations is that the decision to try them out is aided by exposure to the available sources of information. If this were indeed the case, then users of these innovations will be more apt to be able to read and write than be illiterate.

Literacy was determined by asking each respondent whether

125 he could write, could only sign his name, or could do neither.* Those who said they could write a letter are considered here to be
212 literate. All others are grouped together as illiterates or on a low level of literacy.

212 The literacy rating was tested for validity as follows: in
Long Chan literacy is known to be related to age. Ever since
872 1935** there has been a school in the community. Since that date
125 school attendance has been compulsory. Attendance has been fairly full for the last twenty years, but most older residents have never had the opportunity for formal schooling.

212 The survey data reflect this correlation between literacy and
*177 age. Among farmers under 40 years of age, only 16 per cent were
*178 rated as illiterate or barely literate by the survey criterion; while 59 per cent of those of 40 years or older are rated as illiterate. Thus one can have reasonable confidence in the survey
561 response as a rating of literacy.

TABLE 10. LITERACY OF FARMERS INCREASES WITH AGE

	Age	
	Under 40 yrs.	40 yrs. or more
Literacy		
Illiterate	16%	59%
Literate	84	41
Total cases	(79)	(131).

*177 Literacy is linked discernibly to acceptance of the motor and
*178 mushroom growing. The proportion of literate farmers who have tried the motor is twice as high as the corresponding proportion among those who are illiterate. It is less strongly linked to the
228 decision to grow mushrooms, and is, at best, weakly linked to the
241 decision to raise tilapia or to use fertilizer.
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212 * In addition, interviewers asked respondents who said they could write to demonstrate it by writing something on the ques-
* 402 tionnaire.

[125] ** See Singapore Rice Village, op. cit.

TABLE 11. LITERATE FARMERS* ARE MORE LIKELY TO HAVE USED THE MOTOR AND TO HAVE TRIED MUSHROOM GROWING

	Illiterate (Cannot write a letter) (92)	Literate (Can write a letter) (116)
Motor		
Own	16%	26%
Use	35	60
Neither	48	14
Mushrooms		
Have tried	39%	53%
Have not	62	47
Fertilizer		
Have used	12%	17%
Have not	88	83
Tilapia		
Have tried	29%	39%
Have not	71	61

* Male farmers only

If Bang Chan were like certain areas of the United States and Europe, it might be objected that such a relationship between acceptance of innovations and literacy reflects a spurious link with economic level: that illiterates tend to come from the economically deprived strata of the population; hence an observed relationship with literacy may actually reflect the initial correlation with economic level. In Bang Chan, however, this is not the case. A Bang Chan farmer who is well-to-do is as likely to be illiterate as literate, as is illustrated by the table below.

TABLE 12. LITERACY AND ECONOMIC LEVELS ARE UNRELATED IN BANG CHAN*

	Literacy: Low (91)	Literacy: High (119)
Economic Level		
Low	48%	36%
High	52	64

* Male farmers only

Hence the correlation between use of innovations and literacy may be taken at face value and does not reflect a spurious link with economic level.

6: Goldsen and Rolia Z-4.5 (1958) 1957
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Communications Media

With the increasing use of mass communications, the community member is exposed to sources of information other than the printed word. Ownership of radios has nearly tripled in about five years (in the 1955 survey radios were reported in 14 per cent of the households, whereas in 1949* only 5 per cent of the households reported owning a radio). Quite apart from ownership, radio listening is widespread; less than one-fifth of the people in Bang Chan claim they never listen to the radio (18 per cent). Motion pictures are also popular. Only one-tenth claim to having never attended a movie, while half (49 per cent) say they have seen motion pictures more than ten times.

There is, of course, a strong relationship between exposure to one of these media and exposure to the other. Table 13 below indicates that the majority (64 per cent) of respondents who listen to the radio likewise report frequent movie attendance. Similarly, the majority (67 per cent) of those who say they never listen to the radio, reported that they go to movies rarely or never.

TABLE 13. EXPOSURE TO RADIO AND MOVIES AMONG RICE INTERRELATION

	Radio Listening		
Movie Attendance	High Exposure (regular or occasional listeners) (111)	Low Exposure (listen seldom) (148)	No Exposure (60)
High exposure (10 times or more)	64%	31%	13%
Medium exposure (4 to 9 times)	19	17	21
Low Exposure (0 to 3 times)	16	31	67

Exposure to the communications media is strongly linked to acceptance of a basic innovation such as the motor. It is not directly linked to acceptance of the other agricultural innovations (fertilizer, tilapia, mushrooms). Respondents who report frequent exposure to radio listening and motion picture attendance are significantly more likely than others to say they own or have used the motor. (Among daily radio listeners 88 per cent report use of the motor; and this proportion declines steadily until among those who never listen, only 44 per cent use the motor; for movies, the corresponding proportion of users ranges from 74 to 36 per cent.)

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* Siamese Rice Village, op. cit.

TABLE 14. HIGH EXPOSURE TO COMMUNICATIONS MEDIA IS LINKED TO ACCEPTANCE OF THE MOTOR

	Exposure to Radio			
	High			Low
	Listens Daily (43)	Listens Occasionally (66)	Listens Seldom (148)	Never Listens (60)
Small Engine Motor				
Used it	81%	78%	64%	48%
Didn't use it	13	22	36	34

	Exposure to Movies			
	High			Low
	Ten times or more (51)	4-9 times (60)	1-3 times (75)	None (33)
Used it	[redacted]%	69%	59%	36%
Didn't use it		31	31	64

Of course it is important to check whether these relationships hold true when people of different economic levels are examined separately; for literates as well as for illiterates. We infer that the basic link between use of the motor and exposure to the media of communication holds for literate as well as illiterates; for poorer as well as for richer farmers. More specifically, the relationship between exposure to the communications media and decision to use the motor is even more marked for less well-to-do and for the illiterate farmers, in contrast to the better-off farmers and those who can read and write.

TABLE 15. EXPOSURE TO MOTION PICTURES IS LINKED TO ACCEPTANCE OF MOTOR ESPECIALLY FOR THE ILLITERATES AND FOR THE ECONOMICALLY LESS WELL-OFF*

	Exposure to Motion Pictures			
	High		Low	
	(Percentage Using Motor)			
Economic Level				
Low	74%	(47)	44%	(32)
High	83	(44)	73	(48)
Literacy				
Illiterate	63%	(36)	44%	(35)
Literate	89	(77)	83	(41)

* Male Farmers Only

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TABLE 16. INHABITANTS WHO HAVE ADOPTED URBAN EATING PATTERNS ARE MORE LIKELY THAN OTHERS TO BE EXPOSED TO MASS COMMUNICATIONS AND URBAN CONTACTS

	Eating Pattern	
	With hands (342)	With fork and/or spoon (64)
Listens to radio		
Regularly (daily)	10%	23%
Occasionally	17	28
Seldom	51	35
Never	22	10
Has seen a movie		
Ten times or more	40%	72%
4 - 9 times	19	17
1 - 3 times	28	10
Never	13	1
This past year, how many times did you go to Bangkok?		
None	26%	7%
Once	18	13
2 - 4 times	29	23
5 or more times	28	55

When acceptance of urban influences is measured even on the basis of this index, the evidence is clear that it is linked with acceptance of the agricultural innovations. Those responsive to urban influence are twice as likely as others to use fertilizer (21 per cent versus 9 per cent), one and a half times as likely to grow mushrooms (57 per cent versus 39 per cent), and one and a quarter times as likely to use a motor than the others (82 per cent versus 61 per cent). There is no noticeable relationship, however, between tilapia raising and responsiveness to urban influences. The respective proportions are shown in Table 17.

These relationships between acceptance of urban patterns and decision to use certain innovations remain constant for those on high as well as low economic levels and also for the literate as well as illiterate farmers.

TABLE 17. VILLAGERS RESPONSIVE TO URBAN PATTERNS ARE MORE LIKELY THAN OTHERS TO USE AGRICULTURAL INNOVATIONS

Agricultural Innovations	Eat with fork and/or spoon	Eat with hands
Artificial fertilizer		
Tried it	21%	9%
Never did	79	91
Total cases*	(69)	(218)
Mushrooms		
Tried growing	37%	39%
Never did	63	61
Total cases	(84)	(242)
Small engine motor		
Own one or have used it	82%	61%
Never did	18	39
Total cases	(84)	(242)

* For farmers only; excludes all non-farmers

TABLE 18. ACCEPTANCE OF URBAN PATTERNS IS LINKED TO ACCEPTANCE OF MOTOR AND MUSHROOM GROWING, IRRESPECTIVE OF ECONOMIC AND LITERACY LEVELS

	Economic Level				Literacy Level			
	Low		High		Illiterate		Literate	
Acceptance of urban patterns	(Proportion who used motor)							
Eat with hands	55%	(77)	76%	(73)	47%	(73)	83%	(76)
Fork or spoon	75	(20)	89	(34)	69%	(16)	90	(38)
	(Proportion who tried mushroom growing)							
Eat with hands	28%	(77)	58%	(73)	38%	(73)	47%	(76)
Fork or spoon	45	(20)	65	(34)	44	(16)	66	(40)
	(Proportion who used fertilizer)							
Eat with hands	11%	(77)	13%	(73)	10%	(73)	14%	(76)
Fork or spoon	19	(20)	26	(34)	3	(16)	23	(40)

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Contacts Outside the Community

Radio and movies provide indirect contact between the community and the outside world and seem to encourage the acceptance of urban behavior patterns. (See Table 16.) In addition, however, there is direct contact between the community and the capital city. The inhabitants commute to Bangkok to sell their products or to visit. Some go to the city to live for a time, to attend the city's schools, to work as laborers or to serve in the military or police force. For example, about a quarter of the sample (26 per cent) reported that during the year preceding the survey they had been to Bangkok ten or more times. About a third of the sample (35 per cent) have lived in Bangkok, mostly for the purpose of working there. On the other hand, almost half the sample (45 per cent) have never been to the Don Muang Airport; and over two-thirds (69 per cent) have never been to the Annual Agricultural Fair.

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One would expect that such direct exposure to the urban life and values of the capital city, for example, might be linked with greater readiness to try out improved methods of agriculture either because exposure to urban life may mean exposure to more information, or, less directly, may mean exposure to the urban values of economic self-advancement and experimentation. And there is, indeed, a relationship between exposure to the capital city and use of the motor. The two factors are not linked for all the residents--the relationship is a conditional one. That is, it is mainly among illiterate farmers where urban contact is associated with readier acceptance of the motor.

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TABLE 19. ILLITERATE FARMERS* WHO HAVE GREATER CONTACT WITH THE CITY ARE MORE LIKELY THAN OTHERS TO USE THE MOTOR

"This past year, how many times did you go to Bangkok...?"

Literacy	Never or once (Proportion who own or use the motor)		Twice or more (Proportion who own or use the motor)	
Illiterate	44%	(40)	58%	(31)
Literate	83	(36)	88	(83)

* Male farmers only

In the same way, there is a similar conditional link between use of the motor and wider contacts beyond the horizons of Bang Chan. Visits to the airport and to the agricultural fair, for example, (both centers of contact with urban culture) are associated with use of the motor among illiterate farmers. If the farmer can read and write, on the other hand, he is just

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as apt to adopt the motor irrespective of whether he has been in contact with urban culture.

TABLE 20. ILLITERATE FARMERS* WITH WIDER CULTURE CONTACTS ARE MORE LIKELY THAN OTHERS TO USE THE MOTOR

	Illiterate (Proportion using the motor)		Literate (Proportion using the motor)	
Trips to the airport				
None	30%	(40)	84%	(35)
One or more	63	(49)	86	(83)
Visits to the agricultural fair				
None	50%	(67)	85%	(74)
One or more	37	(34)	88	(45)

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*Male farmers only

However, no such relationship was discerned between these culture contacts and trying out either fertilizer, tilapia, or mushrooms.

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Here again, is evidence to support the hypothesis that contacts with urban culture may act as a substitute for literacy in making the farmer more sophisticated about improving his standard of living and level of production. But the data show that such exposure need not result from direct physical contact with urban centers; it can, instead, be a result of indirect contact. Direct physical contact with urban culture, it turns out is effective in increasing the incidence of acceptance of the more complex innovations only for the illiterate farmers of Bang Chan.

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Friendships

The same reasoning which would lead one to expect a higher incidence of acceptance of innovations among those directly exposed to urban contacts would lead to the companion hypothesis: that inhabitants who have a greater degree of internal contacts with their friends and neighbors might tend to try out innovations to a greater extent than those who remain relatively aloof from such social contacts.

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The data show that such contacts have a limited connection with acceptance of innovations. The incidence of motor use and tilapia raising is higher, it is true, among persons who report a wider sphere of social circulation; but there is little relation between social contacts and willingness to try out fertilizer or mushrooms.

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TABLE 21. INCIDENCE OF MOTOR USE IS HIGHER AMONG VILLAGERS WHO REPORT WIDER SOCIAL CONTACTS

	Social Contacts ("...do you have more close friends than most people around here, or about the same as most people around here, or fewer close friends than most people around here?")	
	"More" or "the same" (143)	"Fewer" (55)
Motor		
Has used it	77%	59%
Never did	23	43
Tilapia		
Has tried it	39%	21%
Never did	61	79
Fertilizer		
Has used it	16%	11%
Never did	84	89
Mushrooms		
Has tried them	69%	40%
Never did	31	60

Once again, however, when this link between breadth of social contacts and use of the innovations is examined separately for the literate, compared with the illiterate farmers, we find further substantiation of the previous finding that under certain circumstances contact may act as a substitute for literacy in acceptance of complex innovations. For, although the link between social contacts and use of tilapia remains constant for literate as well as illiterate farmers, it is mainly for those who are illiterate that exposure to wider local social contacts is associated with greater incidence of motor use. [212]

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TABLE 22. AMONG ILLITERATE FARMERS USE OF MOTOR IS LINKED TO WIDER SOCIAL CONTACTS

	Exposure to Influences of Others	
	Have more friends or about the same	Have fewer friends
	(Proportion who tried small motor)	
LITERACY		
Illiterate	64% (36)	26% (27)
Literate	87 (86)	84 (70)
	(Proportion who tried tilapia)	
Illiterate	34% (36)	15% (28)
Literate	43% (86)	26 (27)

[369] This finding corroborates and expands the previous discussion of the culture contact and acceptance of innovations. Exposure to influence of others from outside the community (through contact with the city, with the airport, with the agricultural fair, for example), as well as exposure to the influence of others from within (through friends and associates) closely relates to the decision to use an innovation such as the motor. Its effectiveness is not felt equally by the whole population, mainly instead, by those who are illiterate.

The significance of these internal and external contacts to illiterates may be that through such contacts they are likely to gain needed information and motivation which, if one can read and write, is available through other sources. If one cannot read and write, however, it is the outside world which provides this kind of needed information.

Capital Investment and Debt

426 Bang Chan's economy is largely a money economy and many farmers avail themselves of credit facilities through professional money lenders. Most loans are sought for the purpose of replacing capital equipment and purchasing land and buffalo.*

The present survey secures a rough measure of the extent of such borrowing in Bang Chan. The majority of farmers (59 per cent)

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[113] * See Janlekha, Kamol O. A Preliminary Study of the Economic Conditions of Siamese Rice Farmers in Bang Chan, Thailand. M.S. Thesis Cornell University. 1951, p. 73.

6: Goldsen and Ralis Z-4.5 (1955) 1957
AO7 Central Thai AO7

admit in response to a direct question* that they have a debt. Confidence in the validity of these responses as an index of indebtedness is increased since the expected correlation between indebtedness and ownership of buffalo is reflected in the survey data.

TABLE 23. INCIDENCE OF REPORTED DEBT IS HIGHER AMONG VILLAGERS WHO REPORT OWNERSHIP OF MORE BUFFALOES

	Reported Ownership of Buffaloes		
	None (81)	One to three (153)	Four or more (97)
"...Do you now have a debt?			
Yes	49%	56%	69%
No	51	44	31

When the use of agricultural innovations is examined for those farmers who say they have a debt, compared with those who deny it, it becomes apparent that there is a relationship only between indebtedness and use of the motor but not with any of the other mentioned innovations. Seventy-nine per cent of the male farmers who said they have a debt own or use the motor; among those who claim they have no debt the proportion owning or using the motor is significantly less (60 per cent).

TABLE 24. INCIDENCE OF MOTOR USE IS HIGHER AMONG FARMERS WHO REPORT INDEBTEDNESS

	"...Do you now have a debt?"	
	Yes (125)	No (105)
Motor		
Has used it	79%	60%
Never did	21	40
Tilapia		
Has tried it	37%	33%
Never did	63	67
Fertiliser		
Has used it	14%	16%
Never did	86	84
Mushrooms		
Has tried them	45%	48%
Never did	55	52

"Male farmers only

* The question: "...I'd like to ask about a problem common in rural places all over the world. Do you now have a debt or not?" Janlekha's M.S. thesis, ibid., reports a similar distribution of indebtedness for his sample of 94 farmers.

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*178
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402 One is tempted to speculate about the significance of this relationship. One possibility deserves further investigation if the data were only available. If one important reason for incurring debts is to secure or to replace capital equipment, then those farmers more willing to make a capital investment, even though they incur a debt, are more likely to use the motor. Conversely, farmers unwilling or unable to contract debts for a basic improvement in their capital equipment might be the ones less likely to adopt an innovation such as the motor.

Other Factors

121 A number of other factors which conceivably might have been expected to differentiate those who tried out these innovations from those who never made an attempt to use them were investigated and proved to have no differentiating power. Factors such as age and family size, for example, were examined to see whether differential acceptance existed among younger compared with older age groups, or small as compared with large families. No such differences appeared. In the same way, the survey's rough measures of community integration and identification, certain religious beliefs and superstitions, certain personality traits, of knowledge of political figures, and willingness to perform industrial work likewise revealed no differential rates of acceptance when groups were compared.

*178 USE OF MODERN HEALTH FACILITIES
743
75 Improvements in agricultural production must certainly not be viewed as the only efforts worthy of attention to raise the level of living in Bang Chan. Equally important are efforts to train the population to use modern health practices and facilities.

Hospitals have been available since the twenties in Bangkok and a clinic in Minburi since the thirties. Despite these facilities, much curing continues in the traditional way through priests or certain farmers of the locality who have learned from other practitioners to compound medicines, set bones, deliver babies and expel demons.

743 In the present survey the majority of respondents reported
[125] that they have sometimes in their lives used hospital or clinic facilities. To the question, "Have you ever been to a clinic or hospital?" 63 per cent answered affirmatively. Less than half of those who replied indicated having gone for their own treatment or hospitalization, the remainder for other reasons. The distribution of responses is given below.

36

* 178

743 Use of Health Facilities and Other Factors Associated With
241 Agricultural Innovations

572 Although use of the basic agricultural innovations was shown
426 to be linked to breadth of contacts within the community, on the one hand, and to indebtedness, on the other hand, the association between these factors and use of modern health facilities, although showing the same tendency, is not statistically significant. For the sake of completeness, the figures are reported below:

TABLE 34. NO RELATIONSHIP BETWEEN INDEBTEDNESS OR INTERNAL SOCIAL CONTACTS AND USE OF HOSPITALS AND CLINICS

	"Have you ever been to a clinic or a hospital?"			
	No, never	Yes, for treatment	Yes, for other reasons	Total (100%)
Social Contacts				
"More friends"	31%	39%	36%	(82)
"The same"	42	33	25	(134)
"Fewer friends"	33	44	27	(94)
Do you now have a debt?				
No	40%	31%	29%	(140)
Yes	33	41	26	(192)

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SUMMARY

1. In the community of Bang Chan in Central Thailand, various factors are studied statistically in order better to determine the conditions of acceptance of selected agricultural innovations and conditions for using the facilities of modern medicine in clinics and hospitals. Four agricultural innovations were selected, viz. gasoline motor, raising of fish (tilapia), use of fertilizer, and mushroom culture.

2. The present study was concerned with the initial adoption or trial of innovations, rather than the continuing use of these innovations or the merging of the new with the old features of the culture.

3. While adoption of the gasoline motor was associated with all other agricultural innovations, no generalized acceptance of the new was found because: a) adoption of the gasoline motor bore little or no relation to use of non-agricultural innovations such as hospital and clinic facilities; and b) adoption of gasoline motors was only weakly associated with raising of mushrooms.

4. A cluster of traits including high motivation and sizable capital outlay was associated with the use of the gasoline motor.

7. I understand that, since the last war, there have been, around here, some introductions of new things in the field of rice farming, other farming, gardening, and fishing in order to raise production. What are these various new things?

1.	Fertilizer	9	177*
2.	Small engine	6	178*
3.	New rice seeds	3	125
4.	Tilapia	78	[241]
5.	Other fish, specified	13	[402]
6.	Fish, unspecified	80	[243]
7.	Mushrooms	45	[228]
8.	Poultry	179	[244]
9.	Pigs	11	[235]
X.	Other, specify	68	[231]
0.	Unascertainable	45	

8. Here, some farmers get a lot more rice from one rai of land than others get. Generally speaking, what are the various reasons why this is so? [243] [433]

1.	Fertilizer	99
2.	Skill of the farmer	63
3.	Quality of the soil	66
4.	Irrigation facilities	129
5.	Type of seed	17
6.	Other reason, specify	
		53

9.a. When was it more profitable for you to grow rice, this year just finished, or two or three years ago? [245] [434]

1.	This past year	111
2.	No difference	37
3.	2 or 3 years ago	62
4.	Unascertainable	25
—	Does not apply	58

b. If 2-3 years ago: If this is so, then it has become less profitable to grow rice. Such being the case, have you done anything to improve the income of your family?

7.	Yes	34
8.	No	25
9.	Unascertainable	1

c. If yes: what various things have you done?

5.	Nothing	4
6.	Mushrooms	8
7.	Poultry	8
8.	Fish (Incl. Tilapia)	5
9.	Fertilizer	
X.	Other, specify _____	25
7.	Unascertainable	2

10.a. Do you own a small engine motor, or not? [402]

1.	Yes	70
2.	No	859
—	No Answer	4

125
[402]

b. If no: Have you ever made use of one in your work, or not?
1. Yes 115
2. No 106
5. Unascertainable 8

11. What is your opinion about fertilizer?
(See code at end)

[241]

12.a. IF A FARMER: Have you ever used fertilizer or not?
6. Does not apply 27
7. Yes 32
8. No 232
— No Answer 12

b. IF HAS NOT USED FERTILIZER: For what various reasons have you not used fertilizer?
(See code at end)

c. IF HAS USED FERTILIZER: Have you ever used fertilizer in your seed-beds or not?
9. Yes 20
X. No 13

d. IF HAS USED FERTILIZER: To what extent have you used fertilizer on your fields? On all your fields, or on the larger part of your fields, or on the smaller part of your fields?
1. On all fields 4
4. On larger part of fields 1
5. On minor part of fields 25
6. Unascertainable 1

13. What is your opinion about mushroom growing?
(See code at end)

[244]

14.a. Have you ever grown mushrooms, or not?
1. Yes 143
2. No 188
— No Answer 2

b. IF NO: Do you have any relatives or relative-like neighbors, who have grown mushrooms or not?
3. Yes 141
4. No 44
5. Unascertainable 4

15.a. What is your opinion about tilapia raising?

[228]

b. Have you ever raised tilapia, or not?
1. Yes 104
2. No 225
— No Answer 4

125
[412] 50.d. (In your household) is there a pair of scissors of any kind or not?

7.	Yes, scissors	219
8.	No	114

[207] e. (In your household) is there a radio or not?

9.	Yes, radio	47
0.	No	286

[402] f. (In your household) is there a winnowing machine, or not?

X.	Yes, winnowing machine	102
Y.	No	231

[243] g. (In your household) is there a windmill, or not?
[402]

1.	Yes, windmill	161
2.	No	172

[805] 51. Do you have a wrist watch, or not?
[405]

3.	Yes	79
4.	No	252
—	No Answer	2

[231] a. Here in your household, how many buffaloes do you own?

5.	None	81
6.	One	27
7.	Two	67
8.	Three	61
9.	Four or more	97

b. (Here in your household) how many pigs do you have?

0.	None	321
1.	One	2
2.	Two	2
3.	3 or more	1
—	No Answer	7

[235] c. (Here in your household) how many chickens do you have?

4.	None	35
5.	1 to 2	7
6.	3 to 4	17
7.	5 to 9	31
8.	10 or more	243

d. (Here in your household) how many ducks do you have?

0.	None	308
1.	1 to 2	9
2.	3 to 4	16
3.	5 to 9	58
4.	10 or more	42

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
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*243

Processes of rice production	List of equipment used
Repair dikes	Shovel, spade, hoe
Break and level soil	Plow, harrow, roller, yoke
Irrigation and drainage	Windmill, engine, noria, spade, shovel, hoe
Weeding	Weeding knife, hoe
Harvesting	Sickle
Hauling	Boat
Threshing	Pitchfork, rake, broom
Winnowing	Wooden winnowing spatula, winnowing machine
Storing	Basket, mat bin, box bin

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Most of the equipment enumerated above were indispensible on rice farms. Only where there were substitutions -- for example, the windmill and the internal combustion engine, and the wooden winnowing spatula and the winnowing machine -- either the less costly but more labor using or the more costly but less labor using instruments might be used. It was observed however, that while the less affluent farm operators were able to use the less costly of these irrigation and winnowing equipment, the affluent farm operators kept both and utilized each appropriately. When only a small amount of water was needed in the field, for example, they might use the windmill although the engine was available, because the windmill was already on the field and it was only a question of hitching the noria to it while the use of the engine involved heavy hauling and some extra cost of fuel.

As a matter of fact, both the windmill and the engine were not absolutely indispensable. In 1948, it was found

7: Janlekha X-4,5 (1948-1953)1956 AO7 Central Thai AO7
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243 312 402 that of the total of 104 farms under the survey, 77 farms were equipped with either or both of these major irrigation equipment and 37 farms did not have any of these. It was found also that the average yield of farms with irrigation facilities was 32.2 tang per rai as against 30.7 tang of farms without irrigation facilities. It must be noted, however, that Bangchan farmers reported that the water condition of the 1948-49 crop year was ideal for rice growing, one which occurs only once in a life time. Farmers unequipped with irrigation facilities were thus not as much handicapped as they would be in the less favorable years. Moreover, it has been a customary practice for farmers who had enough water in their fields to drain excess water into the fields of their neighbors who need some water. If the neighbors still need more water, they may get a free use of the windmill which has completed its service for the year to its owner. Thus in a good year, a windmill owner would have less use of the instrument which in turn becomes more available to neighboring farmers. In a drought year, on the other hand, the owner uses more of his windmill, and prospective borrowers have a slim chance to use the instrument. It would appear, then, that if the survey were conducted in a drought year, the disparity between the average yield of farmers owning irrigation facilities and of farmers not owning ones would be much larger than 1.5 tang per rai as was the case for the crop year 1948-49.

243 312 We may thus group farm equipment according to their relative degree of indispensability as follow:

annual depreciation of the equipment in question. In cases where the equipment still had some market values at the end of their servicable lives, these residual values were first deducted from the original costs before they were divided by the length of service. The most complicated cases were those of chala and mard boats and the noria, which involved annual maintenance and minor repair as well as periodical major repair in say every four or five years before they were finally and totally worn out at the end of their rather long services of from twenty to fifty years. In each of these cases, all items of such expenses -- annual maintenance and minor repairs as well as periodical major repairs -- were added to the original cost and the total was divided by the entire length of service in order to arrive at the annual depreciation figure.

With few exceptions, all farm equipment enumerated above have been used by Thai farmers for centuries. Thus, since the establishment of the village there has been no change in the use of such basic agricultural tools as the plow, harrow, hoe, weeding knife and sickle. Moreover, it may be said also that there have been only slight modifications, if any at all, in these equipment during the long course of their usage. The plow, harrow, or sickle which is now being used in Bangchan is perhaps of the same type and appearance as would have been seen centuries ago.

Standing in contrast to these basic agricultural tools, the first known propeller windmill in Thailand, according to testimonies by Bangchan informants, was invented by Nai Yong

7: Janlekha X-4,5 (1948-1953)1956 AO7 Central Thai AO7
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A243 197 178 402

Manichaem of KY8 in 1940. An official report to the Director of the Department of Agriculture in 1940,[2] however, gives the credit to Nai San of Lard Buakhao, Minburi, who lived only four miles to the south of Manichaem's home. The buying up of gasoline engines by the Japanese during the occupation period served to facilitate the spread of this device. Gasoline engines probably came to the village about 1930 or slightly later. In 1948, there were five engines owned by Bangchan residents. Because of the exceptionally good water condition of that year, these engines were not used in rice production. They were not, therefore, included in our calculation of the cost of producing paddy in 1948. It was observed that their use was limited to fishing by the draining method. The winnowing machine, which utilizes a hand-operated fan arrangement, is relatively new. It is rather expensive, costing an average of 498 baht. Only 21 out of the 104 farmers in our 1948-sample could afford to own it, the rest being obliged to use the traditional winnowing method of simply tossing the grains into the air by wooden spatula and letting the wind carry away the chaffs.

According to historical improvement, farm equipment may thus be categorized as follow:

A. Old simple tools without any modification:

Shovel, spade, hoe, plow, harrow, roller, yoke, weeding knife, sickle, boat, pitchfork, rake, broom, wooden spatula, basket, mat bin, box bin.

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2. Submitted by Yingsakdi Israsena and Kamol Janlekha.

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
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B. Old equipment with slight modifications:

Noria (larger ones are now used because they are more adapted to windmills than smaller ones to which human energy was applied in the old days).

C. Recently employed equipment, mostly labor saving devices:

Gasoline engine, first used in Bangchan in 1930 or slightly later.
Winnowing machine, relatively new, date of introduction into the village not certain.
Propeller windmill, allegedly invented in the village, first used in 1940.

On the whole, it may be said that very few improvements have been made in farm equipment. For this, two opposing explanations may be advanced: (1) Little attention has been paid in the past to farm equipment, resulting in continual using of primitive implements which are inefficient and could be improved if enough attention and effort along the line were given; (2) These basic farm equipment are functionally efficient although they may be simple in form -- the fact that there has been no structurally change in the past few hundred years means that they have successfully stood the test of time rather than that the effort to improve these equipment has been lacking.

The author reserves his judgment on the validity of either of these two explanations, for scientific study of rice farm equipment in Thailand on which proper judgment may be based is not known to him.

Draft Animals

231 In Bangchan, as in most of the rice producing areas of the country, only one kind of draft animal is used -- the buffalo. This subject has already been dealt with in the